PROOF OF FORMULA 3.326.1

$$\int_0^\infty \exp(-x^a)\,dx = \frac{1}{a}\Gamma\left(\frac{1}{a}\right)$$

Let $t = x^a$ to obtain

$$\int_0^\infty \exp(-x^a)\,dx = \frac{1}{a}\int_0^\infty t^{1/a-1}e^{-t}\,dt.$$

The integral representation of the gamma function

$$\Gamma(s) = \int_0^\infty x^{s-1}e^{-x}\,dx$$

gives the result.